Satellite Program

Background

China has been trying for several years to develop both polar and geostationary meteorological satellites. The Chinese have promised to make the data from their meteorological satellites available on a free and open basis to NOAA.

China Meteorological Administration (CMA)/ Satellite Meteorological Center (SMC)

CMA's Satellite Meteorological Center was established in 1971. Its director, Mr. Xu Jianmin, worked in the United States several years ago.

SMC's main functions include participating (along with the Chinese Academy of Space Technology or CAST) in the development of China's meteorological satellites; building the ground segment for its meteorological satellites; conducting meteorological satellite research; and receiving, processing, and distributing metsat data. SMC receives data from the NOAA polar orbiters and from the Japanese GMS geostationary satellite. Two Chinese polar-orbiting satellites, FY-1A and FY-1B, were launched in 1988 and 1990, but both ceased functioning shortly after launch. FY-1C is scheduled for launch in 1998. The FY-2 geostationary satellite exploded during pre-launch tests at the Xichang launch facility. The next launch, which will be FY-2's replacement, is scheduled for late 1997.

The FY-1A and B satellites carried a radiometer very similar to the AVHRR on NOAA satellites. The radiometer was a five channel system with two ocean color channels, an IR channel, and two thermal IR channels. The resolution of the direct read-out data was one kilometer. The satellites also had on-board tape recorders. The data from both satellites was broadcast in NOAA's High Resolution Picture Transmission (HRPT), allowing China to use its current ground stations and processing systems. The FY-1C satellite is expected to be similar to its predecessors.

The next FY-2 satellite should also be very similar to its predecessor. The data format is nearly identical to that of the Japanese GMS satellite, again allowing for savings because much of the current ground station and processing instrumentation could be used for the FY-2. The FY-2 will fly an imager with visible, IR, and water vapor channels. The satellite will also have a data collection capability.

SMC has a processing center in Beijing and three ground stations in Beijing, Guangzhou, and Urumqi. It attempts to make wide use of meteorological satellite data, particularly in the social and economic sense. Examples are: forecasting heavy storms and resulting decisions concerning flood diversion, forest fire detection, sea ice monitoring, urbanization, silt deposits at the mouth of the Yellow River, and estimates of agricultural production.

SMC represents China in the Coordination Group for Meteorological Satellites (CGMS). It also participates in the World Meteorological Organization's (WMO) Commission for Basic Systems' Working Group on Satellites. NESDIS has excellent relations with SMC, and over the years a number of SMC trainees and exchange scientists have spent time working at NESDIS facilities. Currently, Mr. Wang Weihe is working on vegetation indices at NESDIS' Office of Research and

Applications. NESDIS scientists have also visited SMC to give presentations and lectures on various aspects of satellite meteorology and meteorological satellites.

National Remote Sensing Centre of China (NRSCC)
The National Remote Sensing Centre of China was established in 1981. It is a specialized organization of the State Science and Technology Commission.

Among its responsibilities are: 1) formulating remote sensing policies, 2) drawing up long-term plans for remote sensing development, 3) coordinating remote sensing activities in China, 4) promoting research, application, and popularization of remote sensing technologies, 5) promoting international cooperation, and 6) providing technical training and information.

NRSCC represents China at the United Nations' Committee on the Peaceful Uses of Outer Space (UNCOPUOS), the Committee on Earth Observations Satellites (CEOS), and the Space Agency Forum (SAF). It has a staff of over 1,600 senior and mid-level scientists and engineers. NRSCC operates the Remote Sensing Satellite Ground Station (RSGS), which receives and processes Landsat data.

NRSCC has departments dedicated to Geographic Information Systems, Land Resources, Aerial Remote Sensing, and Natural Disasters Remote Sensing. The latter department focuses on the use of remote sensing techniques for monitoring natural disasters in China such as flooding, drought, and soil erosion.

Additional organizational backgound can be found in Section **.

Launch Record
In 1988 and 1990, China launched two experimental polar-orbiting satellites, the FY-1A and FY-1B. Unfortunately, both satellites had a short life: the F-1A stopped transmitting visible images 39 days after launch; and the FY-1B lost attitude control approximately six months after launch.

The FY-2 satellite was supposed to be launched in April 1994, but an explosion at the Xichang launch facility destroyed the satellite and caused the death of at least one individual and injury to an unspecified number of others.

On February 15, 1996, China suffered another setback with the launch disaster of the Intelsat 708 only 22 seconds into the launch. This was the second launch explosion in a year which killed several people and injured many more. The number of dead and injured and extent of the damage is unclear, but appears to be greater than what China has publicly stated (see attached CNN web site article). The fact that Xichang is landlocked and that there is a nearby population center have resulted in several deaths over the past few years as a result of launch failures.

State-run launch contractor Great Wall Industries Corp reported the Long March 3B crashed seconds after launch from Xichang Space Center. Analysts have said the giant Long March 3B, which was being used for the first time, could be grounded for months until engineers determine precisely why it failed. The insurance community has indicated that it will be very difficult to

insure satellites launched by any Long March vehicles if China does not provide a credible explanation for the launch failure and show concrete steps to rectify the problem.

Launch Plans Now Delayed

Following the February 1996 explosion, Chinese newspapers confirmed that launch plans would be delayed starting with Apstar 1A, which was postponed by a month to April 10. Apstar 1A is owned by APT Satellite, a Hong Kong firm controlled by Chinese state investors. It is needed to complement Apstar 1, launched by China in July 1994, and make up for the January 1995 loss of Apstar 2 which also blew up after liftoff by a Long March rocket, killing a family of six Sichuan peasants.

The Economic Daily said talks were under way to reschedule planned 1996 launches for six others: Echostar 2 for U.S. firm Echostar, an Iridium orbiter for Motorola Corp, Mabuhay for the Philippines and China's own Dongfanghong (East-is-Red) 3, Chinastar 7 and Fengyun 2.

NESDIS is interested in learning whether these recent commercial launch failures that the Long March vehicle has experienced will have an impact on the launch schedule of China's meteorological and environmental satellites.

China-Brazil Earth Resources Satellite

China's CAST (which has a similar relationship with SMC as NASA has with NOAA) and the Brazilian space agency INPE are developing the China-Brazil Earth Resources Satellite (CBERS). The first of the series was scheduled for launch in 1994 and the second in 1996, but so far budgetary problems (mostly on the Brazilian side) have caused slips in the schedule. The launch and spacecraft will be provided by the Chinese. China and Brazil recently announced plans to build two additional spacecraft.

CBERS' primary applications are environmental data collection, space environment monitoring, environmental monitoring, and land surface applications. The instrument suite includes a camera system with visible through near infrared frequencies, a data collection platform, IR multiscanner with wavelengths for the visible to near infrared and thermal IR, and a Wide Field Imager camera with a visible and near infrared channel. Some of the applications for its data include snow cover monitoring, water resource management, drought monitoring, and forest fires.